

### Trend Study 16B-3-02

Study site name: Rocky Hollow.

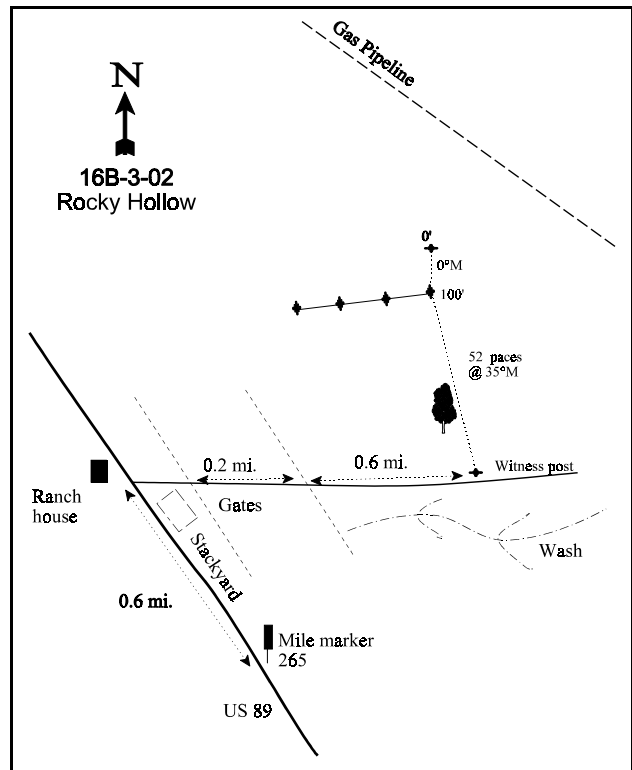
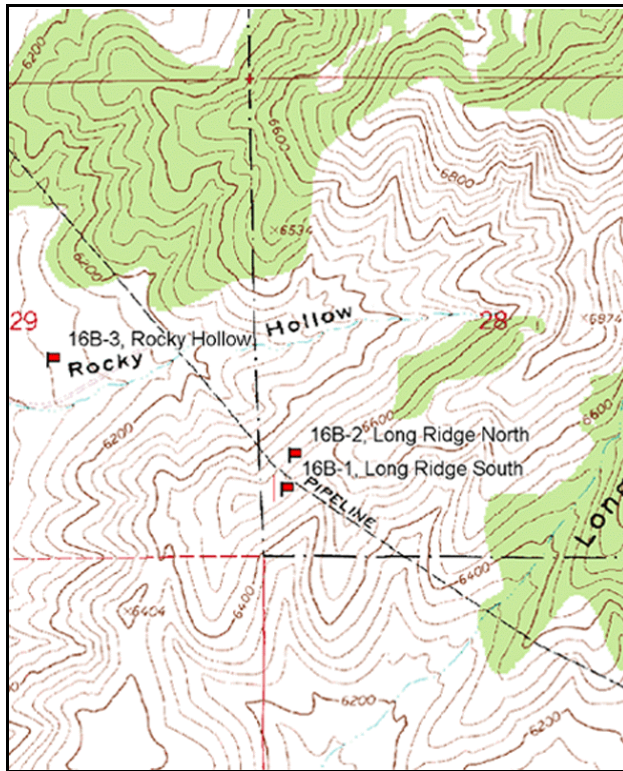
Vegetation type: Big Sagebrush-Grass.

Compass bearing: frequency baseline 180 degrees magnetic (lines 2-4 @ 260°M).

Frequency belt placement: line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

### LOCATION DESCRIPTION

Go north from Fairview on U.S. 89 for approximately 15 miles to a ranch house and stackyard (0.6 miles north of mile marker 265). Turn right, go through a DWR gate into Lassen Draw property. Go 0.2 miles to another gate/fence. Continue up road another 0.6 miles to a green and red witness post on the left ( north) just 3 paces off the road. From the witness post, walk 52 paces at 350 degrees magnetic to the 100-foot baseline stake. The 0-foot stake is marked by browse tag #180.



Map Name: Indianola

Diagrammatic Sketch

Township 11S, Range 4E, Section 29

GPS: NAD 27, UTM 12S 4409088 N 457476 E

## DISCUSSION

### Rocky Hollow - Trend Study No. 16B-3

The Rocky Hollow study samples the sagebrush type in the swales at the base of the foothills. It is on Division property and samples the same area as an old line-intercept transect. Elevation at the site is 6,050 feet with a gentle 5% slope and a western aspect. Big game use on the site has been relatively heavy during winters, especially by mule deer. Quadrat frequency of deer pellets has been high at 38% and 48% in 1997 and 2002 respectively. Elk use is much lighter with a quadrat frequency of 19% in 1997 and only 1% in 2002. Pellet group transect data taken in 2002 estimated 137 deer days use/acre (337 ddu/ha). No elk pellet groups were sampled in the transect. Cattle pats have been observed on the site in all sampling years but they are few in number, apparently from just a few trespass cattle.

Soils are moderately deep with an effective rooting depth estimated at almost 16 inches. Soil texture is a sandy clay loam with a slightly acidic pH (6.1). Large rocks are present on and just below the soil surface. The presence of rock on the surface and throughout the profile increases as one moves down the slope. Soils are stable as vegetation, litter, and cryptogams are abundant and appear to effectively limit erosion. An erosion condition classification determined the site to be stable in 2002.

The key browse species consists of a moderately dense stand of mountain big sagebrush (*Artemisia tridentata vaseyana*) which appears to be hybridizing with basin big sagebrush (*A. tridentata tridentata*). Density was estimated at 2,599 plants/acre in 1989. Utilization was light to moderate with normal vigor on most plants. Percent decadence was relatively high at 38% with poor recruitment as there were no seedlings and only 3% of the population were young plants. With the much larger sample used in 1997 and 2002, sagebrush density was estimated at a lower but more accurate level. In 1997, density was estimated at 1,700 plants/acre, slightly declining to 1,600 plants/acre in 2002. Nearly two-thirds of the sagebrush population is composed of mature plants, with the decadent class representing most of the remaining population. Seedlings and young were present in small numbers on the site. Seedlings increased in 2002 which is surprising due to the drought conditions. Dead plants number 660 plants/acre in both 1997 and 2002. Utilization has been moderate overall, with a few plants displaying heavy use in 2002. Vigor was normal on all but 14% of the population. Annual growth on sagebrush averaged 2 inches in 2002. Previous to the 2002 reading, it was reported that some of the decadency (partial crown death) and reduced vigor could be the result of winter injury.

Small numbers of serviceberry and bitterbrush offer additional forage. However, these species occur in very low densities. These species will likely remain in low densities in the future as reproduction is nearly absent for both. The most abundant shrub is stickleaf low rabbitbrush which numbered almost 3,000 plants/acre in 2002. This is an increase from just over 2,000 plants/acre estimated in 1997. Age class distribution indicates a stable population with mostly mature plants. Prickly pear cactus is also relatively abundant providing 10% of the browse cover in 2002.

The herbaceous understory is dominated by annual species. Annual grasses, primarily cheatgrass, were sampled in nearly every quadrat in 1997 and 2002. Annual forbs consist mostly of very small species such as bur buttercup, pale alyssum, and little-flower collinsia. Both annual grasses and forbs increased in sum of nested frequency in 2002, even with drought. Perennial grasses and forbs are found almost exclusively under the protection of shrub canopies. Bluebunch wheatgrass and Sandberg bluegrass are the most abundant perennials, both increasing in nested frequency in 2002. Bottlebrush squirreltail, needle-and-thread grass, and Indian ricegrass are present but infrequent. As with other sites in this unit, perennial forbs were the vegetative class most effected by drought in 2002. Sum of nested frequency of perennial forbs declined by 39% between 1997 and 2002. Normal precipitation in the future should reverse this decline.

## 1989 APPARENT TREND ASSESSMENT

The condition of this site is rather poor. The preferred species, both forbs and browse, are depleted and increasers are common. Sagebrush appears to be stable to slightly declining with a mostly mature and decadent age structure and few young plants. Overall vegetative trend appears down on the untreated areas, and soils appear to be declining as well with a high amount of bare soil.

## 1997 TREND ASSESSMENT

The soil trend appears stable with similar amounts of protective ground cover as reported in 1989. Trend for mountain big sagebrush appears stable due to improved reproduction and slightly reduced decadence. Dead plants are common, suggesting that the decline in density can mostly be explained by the number of dead plants not the greatly increased sample size. The increaser, sticky leaf low rabbitbrush, also appears stable. Trend for the herbaceous understory is up slightly. Sum of nested frequency for perennial grasses has increased slightly, while frequency of perennial forbs has more than doubled since 1989.

### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - up slightly (4)

## 2002 TREND ASSESSMENT

Soils have a stable trend. Ground cover characteristics remained stable between 1997 and 2002. Erosion is minimal at the present time. Trend for the key browse, mountain big sagebrush is stable. All of the key parameters show stable trends including density, reproduction, percent decadence, and vigor. The herbaceous understory has a slightly downward trend with a 24% decrease in sum of nested frequency for perennial species. There was an increase in both annual grasses and forbs.

### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - slightly down (2)

## HERBACEOUS TRENDS --

Herd unit 16B, Study no: 3

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
G	Agropyron smithii	-	2	-	-	1	-	.03	-
G	Agropyron spicatum	ab80	a63	b101	32	28	45	3.84	4.05
G	Bromus japonicus (a)	-	a-	b86	-	-	32	-	.50
G	Bromus tectorum (a)	-	b328	a319	-	98	97	13.18	6.80
G	Oryzopsis hymenoides	b15	a3	a3	7	1	1	.38	.03
G	Poa secunda	a43	b104	b111	20	38	45	3.18	2.15
G	Sitanion hystrix	ab23	b39	a12	12	21	5	.89	.36
G	Stipa comata	a-	b9	ab3	-	5	2	.46	.18
Total for Annual Grasses		0	328	405	0	98	129	13.18	7.31
Total for Perennial Grasses		161	220	230	71	94	98	8.80	6.80
Total for Grasses		161	548	635	71	192	227	21.98	14.11

Type	Species	Nestled Frequency			Quadrat Frequency			Average Cover %	
		'89	'97	'02	'89	'97	'02	'97	'02
F	Agoseris glauca	a-	b15	ab9	-	8	4	.26	.16
F	Alyssum alyssoides (a)	-	a170	b317	-	62	95	.71	6.76
F	Allium spp.	a13	b61	c84	8	27	43	.20	.30
F	Antennaria rosea	-	3	-	-	1	-	.00	-
F	Astragalus beckwithii	a-	b21	b26	-	13	12	.58	.12
F	Astragalus utahensis	a-	b22	a-	-	11	-	.79	-
F	Castilleja linariaefolia	a-	b17	a4	-	8	1	.21	.00
F	Camelina microcarpa (a)	-	2	3	-	1	1	.00	.00
F	Cirsium spp.	-	3	-	-	1	-	.03	-
F	Collomia linearis (a)	-	b46	a15	-	22	7	.11	.03
F	Comandra pallida	3	-	-	1	-	-	-	-
F	Collinsia parviflora (a)	-	a313	b340	-	95	99	3.76	8.25
F	Crepis acuminata	4	1	3	3	1	1	.00	.00
F	Cymopterus longipes	a-	b39	a-	-	16	-	.08	-
F	Erigeron pumilus	2	-	-	1	-	-	-	-
F	Eriogonum racemosum	3	-	-	1	-	-	-	-
F	Lithospermum ruderae	3	15	10	3	6	4	.49	.19
F	Lomatium triternatum	b21	a3	a-	13	1	-	.00	-
F	Lupinus argenteus	6	6	-	4	4	-	.40	-
F	Machaeranthera canescens	4	-	-	1	-	-	-	-
F	Microsteris gracilis (a)	-	a6	b26	-	3	12	.01	.06
F	Phlox longifolia	1	7	2	1	3	2	.01	.01
F	Polygonum douglasii (a)	-	b14	a1	-	7	1	.18	.00
F	Ranunculus testiculatus (a)	-	a72	b215	-	29	65	.54	4.22
F	Sphaeralcea coccinea	51	61	61	22	22	28	1.23	.99
F	Tragopogon dubius	-	5	-	-	4	-	.04	-
F	Vicia americana	a54	b137	a53	25	51	28	3.19	1.06
Total for Annual Forbs		0	623	917	0	219	280	5.32	19.35
Total for Perennial Forbs		165	416	252	83	177	123	7.54	2.85
Total for Forbs		165	1039	1169	83	396	403	12.87	22.21

Values with different subscript letters are significantly different at alpha = 0.10

## BROWSE TRENDS --

Herd unit 16B, Study no: 3

Type	Species	Strip Frequency		Average Cover %	
		'97	'02	'97	'02
B	Amelanchier alnifolia	2	2	.03	.03
B	Artemisia tridentata vaseyana	61	58	11.59	14.92
B	Chrysothamnus viscidiflorus viscidiflorus	54	61	3.90	2.82
B	Gutierrezia sarothrae	0	1	-	-
B	Mahonia repens	0	1	-	-
B	Opuntia spp.	56	55	1.75	2.12
Total for Browse		173	178	17.27	19.90

## Key Browse Annual Leader Growth

Herd unit 16B , Study no: 3

Species	Average leader growth (in) '02
Amelanchier alnifolia	3.1
Artemisia tridentata vaseyana	2.0

## BASIC COVER --

Herd unit 16B, Study no: 3

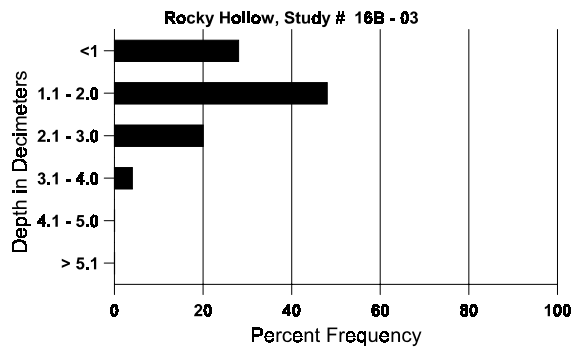
Cover Type	Nested Frequency		Average Cover %		
	'97	'02	'89	'97	'02
Vegetation	382	384	10.00	46.29	57.96
Rock	151	171	10.75	7.54	7.44
Pavement	64	156	6.00	.98	2.80
Litter	380	367	53.25	37.26	32.64
Cryptogams	185	104	1.75	3.27	4.30
Bare Ground	241	221	18.25	16.51	15.26

## SOIL ANALYSIS DATA --

Herd Unit 16B, Study no: 03, Rocky Hollow

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
15.5	50.4 (15.7)	6.1	54.7	24.7	20.6	1.5	22.8	316.8	.4

## Stoniness Index



### PELLET GROUP FREQUENCY --

Herd unit 16B, Study no: 3

Type	Quadrat Frequency	
	'97	'02
Rabbit	5	24
Elk	19	1
Deer	38	48
Cattle	2	1
Sheep	-	-

Pellet Transect	
Pellet Groups per Acre 02	Days Use per Acre (ha) 02
-	-
-	-
1775	137 (337)
9	1 (2)
9	1 (2)

## BROWSE CHARACTERISTICS --

Herd unit 16B, Study no: 3

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier alnifolia																		
S	89	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	89	-	-	-	-	-	-	1	-	-	1	-	-	-	66		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	89	-	-	2	-	-	-	-	-	-	1	-	1	-	133	29	29	
	97	-	-	1	-	-	1	-	-	-	2	-	-	-	40	32	41	
	02	-	-	-	-	1	-	-	-	-	1	-	-	-	20	46	47	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	1	-	-	-	-	1	-	-	-	20		1	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			67%			33%			-80%							
'97		00%			100%			00%			+ 0%							
'02		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	199	Dec:	0%			
												'97	40		0%			
												'02	40		50%			
Artemisia tridentata vaseyana																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	02	20	-	-	-	-	-	-	-	-	20	-	-	-	400		20	
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	97	5	1	-	1	-	-	-	-	-	7	-	-	-	140		7	
	02	3	-	1	-	-	-	-	-	-	4	-	-	-	80		4	
M	89	13	10	-	-	-	-	-	-	-	21	1	1	-	1533	32	31	
	97	30	23	-	-	-	-	-	-	-	53	-	-	-	1060	35	51	
	02	23	20	8	1	-	-	-	-	-	52	-	-	-	1040	31	39	
D	89	7	8	-	-	-	-	-	-	-	14	-	-	1	1000		15	
	97	12	13	-	-	-	-	-	-	-	16	-	-	9	500		25	
	02	5	12	3	2	1	1	-	-	-	13	-	-	11	480		24	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	660		33	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	660		33	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		46%			00%			05%			-35%							
'97		44%			00%			11%			- 6%							
'02		41%			16%			14%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	2599	Dec:	38%			
												'97	1700		29%			
												'02	1600		30%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
S	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
Y	89	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	97	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
	02	5	-	-	1	-	-	-	-	-	6	-	-	-	120		6	
M	89	36	-	-	1	-	-	-	-	-	31	-	6	-	2466	13	13	
	97	98	-	-	-	-	-	-	-	-	97	-	-	1	1960	12	17	
	02	114	-	-	1	-	-	-	-	-	115	-	-	-	2300	10	16	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	2	-	-	-	-	-	-	-	-	1	-	-	1	40		2	
	02	23	1	-	1	-	-	2	-	-	22	-	-	5	540		27	
X	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			15%			-23%							
'97		00%			00%			02%			+31%							
'02		.67%			00%			03%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	2666	Dec:	0%			
												'97	2040		2%			
												'02	2960		18%			
Gutierrezia sarothrae																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	02	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'97		00%			00%			00%										
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-			
												'97	0		-			
												'02	60		-			
Mahonia repens																		
M	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'97		00%			00%			00%										
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	0	Dec:	-			
												'97	0		-			
												'02	20		-			



A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Opuntia spp.																		
S	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
Y	89	4	-	-	-	-	-	-	-	-	4	-	-	-	266		4	
	97	-	-	-	1	-	-	-	-	-	1	-	-	-	20		1	
	02	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	89	14	-	-	-	-	-	-	-	-	11	-	3	-	933	6 16	14	
	97	111	-	-	4	-	-	-	-	-	115	-	-	-	2300	11 17	115	
	02	71	-	-	-	-	-	-	-	-	70	1	-	-	1420	6 20	71	
D	89	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	97	4	-	-	-	-	-	-	-	-	3	-	-	1	80		4	
	02	8	-	-	1	-	-	-	-	-	7	-	1	1	180		9	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			17%			+50%							
'97		00%			00%			.83%			-33%							
'02		00%			00%			02%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	1199	Dec:	0%			
												'97	2400		3%			
												'02	1620		11%			
Purshia tridentata																		
Y	89	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	97	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	02	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'89		00%			00%			00%										
'97		00%			00%			00%										
'02		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'89	66	Dec:	-			
												'97	0		-			
												'02	0		-			